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FORESTRY FACTS

A Compendium of Handy Information on America's Great Heritage of Forests

CONTENTS

	Page		Page
American forest week	1	Grazing	10
Public opinion	2	Fish and game	10
The forestry problem	2	National forests	11
Forests and floods	3	Forest research	12
Forests and industry	6	Forestry legislation	13
Forest fires	7	Miscellaneous facts	15
Forestry practice	7	American forest week committee	16
Farm woodlands	9	State forestry statistics	16

AMERICAN FOREST WEEK

What It Is

Eight years ago, in 1920, the idea of devoting one week of the year to an educational campaign in the interest of forests originated in the Pacific Northwest. At first this week was called "Forest protection week," and was largely observed in the West. In 1921, President Harding brought the Federal Government behind the idea and issued the first presidential proclamation. President Coolidge has given the plan his approval and has issued a proclamation each successive year.

In 1925, because of the breadth and importance of the Nation's forestry problem, President Coolidge enlarged the scope of the undertaking and in his proclamation changed the name to American forest week. Many governors have likewise issued special State proclamations. Canada, in view of the international aspect of the forestry problem, jointly agreed in 1926 and 1927 to celebrate the week concurrently with the United States, and this joint observance by the two countries is continued in 1928. In Canada the week is known as "Save the forests week," but its observance is essentially the same in character as in our own country. Newfoundland also joined the annual American forest week movement in 1927.

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American forest week is strictly and wholly educational in plan and purpose. It is an annual call to all citizens of America, both young and old, to lend their interest and support in bringing about better forestry conditions. It has no other goal than that which a rightly informed public opinion may of itself set up and seek.

The national American forest week committee, of which Theodore Roosevelt, of New York, is the general chairman for 1928, is composed of more than 100 organizations which represent almost every conceivable form of interest—the Federal Government, State governments, the lumber industry, outdoor, wild life, and recreational interests, foresters, forestry and tree associations, women's organizations, labor groups, irrigation and power companies and associations, fire-prevention organizations, and many others.

American forest week is the outstanding opportunity of the year for every form of interest in trees, forests, and conservation to find expression, each in its own way and working in its own local sphere of influence. The purpose and aim of the week is that the general welfare may be promoted through the taking of common counsel on the forestry and related problems of the Nation, and by the formation of intelligent public opinion that will stimulate action, individually and collectively, under the impulse thus given.

PUBLIC OPINION

"* * * No other of our internal problems is of greater moment than the rehabilitation of our forests, now so hopefully begun but needing the strong support of our collective will and intelligence. * * * One-fourth of our soil is better suited to timber-growing than anything else. I cannot escape the conviction that our industrial and agricultural stability will be strengthened by bringing into full productivity this great empire of land.

"Consider what blessings the use of this land for intensive forest culture would bring to our country. Our migratory forest industries would be stabilized and made permanent. Rural industry would be greatly strengthened and vitalized. Agriculture would find in silviculture a strong ally, providing markets for farm produce and for surplus labor. * * * With widespread forest culture, new wealth would spring up for the support of roads, schools, and local government, and the rural regions would enjoy a larger share of the national prosperity. For some of our surplus capital now seeking investment abroad, new outlets would be found in forest production. Our people would then have an assured supply of timber and would see the hills and waste places reclothed with forests for their pleasure and inspiration."

—CALVIN COOLIDGE.

THE FORESTRY PROBLEM

Forest Conservation a National Responsibility

"As long as conservation is a dominant factor in the perpetuation of the country's forests, the people of the United States must accept forestry as an opportunity as well as a responsibility," says E. A. Sherman, associate forester of the Forest Service.

The fact that the dark side of forestry has been overdrawn, Mr. Sherman asserts, is largely the result of the magnitude of the task involved in the conservation and restoration of our forests. The evidence of the economic disaster confronting our Nation has made forestry somewhat of a bugbear notwithstanding the fact that the intelligent people of the United States now thoroughly understand and deplore the fact that 81,000,000 acres of forest land are idle, and that the United States is consuming each year four times as much timber as it grows.

"For long years past we have bewailed our wasted forests, our idle acres, our silent mills and abandoned towns, the rapid diminution of our remaining forest resources, the blindness and stupidity of our national carelessness with fire. We have preached the curse of wasted resources, blackened stumps, barren lands, and economic damnation generally; but I want to urge that henceforth we preach the blessing of new and better forests, industries restored upon a permanent basis, and the landscape beautiful arising from the ashes of the landscape desolated."

Viewing the forestry situation today, Mr. Sherman declared the people of the Nation must realize expenditures for forest protection and production, increase our national wealth and tend to reduce the national burden upon industry, and that such expenditures are an exceedingly safe and profitable investment.

"We must sell to our people the idea that beauty as well as the utility of our forests has a real value measurable in dollars and cents in that it makes the country more attractive for the habitation of man and adds materially to the sale value of every acre of land within the radious of its influence."

Unstable Land Ownership Greatest Obstacle to Forestry Progress

Unstable land ownership is to-day the greatest single obstacle to the rapid spread of timber growing throughout the country, according to W. B. Greeley, Chief of the Forest Service.

This unstable ownership, says Colonel Greeley, is represented by the land speculator, or the lumber company which intends to dispose of its holdings when cut over, or the State without a policy of permanent forestry for its timberlands, or the State, county, or town which is anxious to have tax-reverted lands chiefly valuable for timber growing put back on the assessor's rolls. If all or most of the 470,000,000 acres of forest land in the continental United States were in the hands of owners whose future returns rested on actual use of the land, the Nation's forest problem would be much nearer solution.

The ownership of forest land in the United States is in round numbers as follows: Federal Government, 89,000,000 acres; States, 10,500,000; municipalities and counties, 700,000; private owners, large, 220,000,000, and private owners, small, 150,000,000 acres.

From the standpoint of stability, the holdings of municipalities, small pri-

vate owners, and the Federal Government rate relatively high, the Forester states. State holdings vary from highly stabilized to wholly unstable. Large private holdings are in the main unstable, but with strong evidence of a trend toward greater stability. This trend constitutes the most significant feature of the present forest situation in the United States.

Eventually stable public ownership and management of not less than one-third of our forest land will probably be found wise. The Federal Government now owns nearly one-fifth, most of which is under permanent administration as national forests and national parks. Existing laws look to some enlargement of this area. In part it will come about through adding lands from the open public domain. In part private lands will be acquired. It is not advisable to purchase additional Federal holdings where local needs can be met by State or municipal forests or by the extension of farm and industrial forestry. State and municipal forest holdings are now far fewer and smaller than is desirable, if not imperative, in order to bring our forest-land ownership as a whole into reasonable stability.

A great deal of the present instability of private land ownership is due to special conditions which make it impracticable for particular individuals to handle their forest properties as permanent investments. Unquestionably, also, privately owned timberlands do not always afford sufficient prospects of financial return under permanent management to constitute a promising investment, at least under present conditions. The hazards arising from inadequate protection from fire or taxation systems ill adapted to timber culture are not infrequently genuine deterrents. On the other hand, failure to appreciate the economic trend of timber supply and timber values is often the reason why commercial timber growing is not undertaken on a much broader scale. To break down this obstacle is primarily a task of education and demonstration—in a broad sense, of salesmanship.

Open-minded lumbermen are coming to see that if they accept in good faith the idea of self-government in industry they must not ignore a public responsibility created by land ownership. While that is not a responsibility to engage in the business of timber growing as a permanent commitment against their will, nor a responsibility to sink money in unsound ventures, it does impose an obligation to weigh carefully, as business men, the methods of forestry; and that the lumbermen are increasingly ready to do.

Educational work to induce forest-land owners generally to take up timber growing where this is the best form of land use, research to discover the best practices and clear the path of removable obstacles, a continued and widened campaign to lessen the evil of forest fires, and general enlightenment of the facts basic to sound State policies of forestry, constitute the most important immediate public need. To meet this need calls for carefully coordinated effort by all available agencies in a sustained drive under a common program. Forestry is both a national and a local problem, but even the national problem requires for its successful working out a localized as well as general attack. Each State must have a flourishing forestry movement of its own, based primarily on its individual needs and directed to the realization of a program adequate to its specific situation. The ultimate objective is to bring under permanent beneficial use for forest purposes all of the forest land in the country on which stable management has not begun.

FORESTS AND FLOODS

Forests Play Important Rôle in Flood Control

Forests are not only an important factor in regulating stream flow, but also aid in modifying climate and the character of the soil, tending toward the improvement of the water-storage capacity of any watershed, according to Raphael Zon, director of the Lake States Forest Experiment Station.

The part that forests play in the regulation of stream flow has been clearly brought out by scientific investigation over a great many years and in many parts of the world, says Director Zon, and these conclusions of the relationship of forests and floods are of particular interest just now when ways and means of preventing floods and regulating flood waters are being given such wide consideration. Mr. Zon states:

"A national policy which, though considering the direct value of forests as a source of timber, fails to take full account also of their influence upon erosion, the flow of streams, and climate, may easily endanger the well-being of the whole people."

The tendency of the forest is to equalize the flow throughout the year of all streams having their origin in tree-covered mountain regions, through

the combined effects of the forests upon air and soil temperature, relative humidity, effective precipitation, evaporation, wind, physical character of the soil, and run-off of water, which in turn control stream flow. A comparison of many streams having forested and nonforested watersheds supports the conclusions reached by the study of contributing factors.

Experiments show the effect of forest cover to be most beneficial on steep slopes, at the higher elevations, and on nonporous soils. The forest breaks the force of storms, absorbs some of the water, permits still more water to seep down into the soil where it is gradually released to feed the springs and larger streams. The maintenance of a forest cover is shown to be the cheapest and best way of preventing erosion by its tendency to bind the soil in place.

Forestry and Flood Prevention

The year 1927 brought two major disasters that have thrown into bold relief the need for national foresight in dealing with the perpetual menace of floods. In the Mississippi Valley and in New England raging waters took a huge toll of lives and property. In dealing with the problem of preventing a recurrence of such disasters, it is essential, says Ward Shepard, forest inspector of the Forest Service, that every factor which contributes to floods be adequately taken into account. He adds:

"Levees, reservoirs, and other structures for holding or diverting water always have been and always will be the primary means of flood control; but indispensable as engineering works are to be harnessing of flood crests, they should be backed up by measures to reduce floods at their source, through the restoration of forests and grasslands as soil and water holders and the protection of farm lands from soil washing and gullying.

"The effect of the destruction of vegetation and humus seems insignificant on this or that acre, this or that farm, this or that stretch of woodland. But when we sum up the aggregate volume of erosion and run-off in an immense catchment basin like that of the Mississippi and compare this volume with the size of the stream channel that must carry the load of water and soil, we gain a new conception of the importance of surface conditions. Floods in large rivers begin as little drops of water and little grains of sand on millions of acres. Every tree, every bush, every fallen leaf, every blade of grass, every contour furrow, every ounce of porous topsoil that impedes the progress of these drops of water and grains of sand toward the main channel relieves the lower river of some of its load.

"It is frequently asserted that deforestation has no influence on large rivers because great floods occurred before the forests had been touched by the ax. At the opposite extreme, it is asserted that floods are due primarily to deforestation. It is necessary to use moderation and common sense in approaching this problem. Forests can not prevent the great floods that come from heavy, long continued, widespread rains, especially when combined with the rapid melting of snow. On the other hand, both common-sense observation and careful study have shown that forests may reduce the violence of floods and erosion not only in small watersheds but in large river systems.

"Engineering works are a primary essential in flood control, but well-kept forests will supplement and protect them. The prudent use of forest land, like the prudent use of farm and grazing land, pays its own way, and the gain to flood control is a by-product without cost. A national policy which, though considering the direct value of forests as a source of timber, fails to take account also of their influence upon erosion, the flow of streams, and climate, may easily endanger the well-being of the whole people."

Unwise Land Use Intensifies Mississippi Flood Burden

The unwise use of forest and agricultural land is not only adding to the flood burden of the Mississippi River but is unnecessarily destroying millions of acres of rich and productive land.

This fact is clearly set forth in an intensive study of the entire Mississippi River drainage system made by the Forest Service to determine the place of forests and forest use in the great problem of flood prevention and control.

The immediate problem of flood control, the report states, can be met with the required promptness only by engineering structures. But back of the 30,000 square miles of bottom lands requiring protection against floods is the vast area of the remainder of the Mississippi Basin, and back of the great engineering problem confronting the Army engineers there is a great problem of land use, intricate and far-

reaching, but having an important bearing on the regimen of the stream.

In making this study, the Forest Service divided the Mississippi system into six major drainage areas, 80 per cent of which was found to be non-forested. The forest areas include about 250,000 square miles, a very small part of which is in a virgin condition, the remainder being largely cut over, with 35,000 square miles so denuded of forest or other valuable growth as to be classified as "waste" or "idle" land.

In the entire Mississippi drainage area the Forest Service classified lands aggregating some 283,000 square miles as "critical" areas, which, by reason of the character of the soil, topography, and precipitation, were heavy contributors to flood conditions. On such areas, forestry experts claim that the character and density of forest cover has a direct relation to run-off or soil erosion, and lack of forests increases torrential run-off and causes serious erosion. Based on their present tendency to help prevent floods, 64,000 square miles of these critical areas were classed as beneficial, 75,000 as of neutral effect, and 144,000 square miles as positively detrimental.

Outside of the national and State forests of the region, where fire prevention and watershed protection already are being given attention, the forest areas of the Mississippi Basin are of two classes—commercial forests in private or corporate ownership, and farm woodlands. Common to all is the fire hazard and injury which results from the ravages of fire. Fires are in every region reducing the water-storage capacity of the privately owned commercial forests, and freshet run-off accompanied by unnecessary erosion result. No matter what other steps are proposed or special remedies suggested, the Forest Service states, effective fire control is needed in all the forest region on the Mississippi watershed. It is the first step in developing the possibilities of forests for flood prevention.

The most difficult part of the forest problem on the Mississippi drainage, according to foresters, is that having to do with the 115,000 square miles of forest lands in farms and in regions primarily agricultural. Mismanagement of farm soils and farm woodlands, owing to lack of technical knowledge or advice, was everywhere evident. In addition to unwise clearing, the most prevailing faults were found to be overgrazing, lack of adequate fire control, and the toleration of idle or waste lands, 10,000 square miles of which were found in farm ownership in the Mississippi Basin.

The Bad Lands of North Dakota, South Dakota, Wyoming, and Montana—a treeless area of 15,500 square miles, was given special study and was found to be the source of a considerable part of the silt that gives the Missouri River the name of "Big Muddy." It is calculated that more than 144,000,000 tons of soil is washed from the Bad Lands annually—some 26 per cent of the total sediment carried by the Missouri coming from less than 3 per cent of the watershed. A somewhat similar erosion problem is presented by "The Breaks" of the Southwest—a region which marks the boundary between the Staked Plains of the Texas panhandle and the lower rolling red prairie country to the east.

Eight specific recommendations designed to correct these evils and to supplement levees, reservoirs, and spillways as flood preventive measures are made by the Forest Service.

1. Extension of cooperative fire prevention to all forests on the Mississippi watershed, under section 2 of the Clarke-McNary law, as rapidly as the States and private owners will undertake their share of the work.

2. Idle waste lands on farms and submarginal land should be planted to forests under the cooperative provisions of the Clarke-McNary law.

3. Instruction to owners of 105,000 square miles of forest land in farm ownership that they may keep pace with planting and the marketing of forest products.

4. Complete the purchase of 2,642,000 acres of protection forest land in national-forest-protection units already approved and established by the National Forest Reservation Commission on the Mississippi watershed, and purchase approximately 5,900,000 acres more of protection-forests lands adjoining two existing national forests in Arkansas and in 15 other units on the Mississippi drainage.

5. Continue to protect and administer present national forests, parks, and game refuges under present policies, and add to national forests adjoining forested areas of unreserved public domain.

6. Authorize investigations of Bad Lands and "The Breaks" as a research project, with a view of discovering some method of preventing present serious erosion.

7. Adopt plan of control of public grazing lands recommended by the Sec-

retary of Agriculture and the Secretary of the Interior.

8. Provide for such water-flow measurements and determination of silt content as may be necessary to show from time to time what progress, if any, is being made in checking soil erosion.

It can not be too strongly emphasized, the Forest Service says, that what is involved is a great problem of land use. Furthermore, the measures which are reported to be essential to the effective regulation of the flow of the Mississippi River have previously been recommended by the Department of Agriculture as desirable on account of other economic benefits to be derived therefrom, such as a better timber supply, soil conservation, improved agricultural conditions, betterment of the livestock industry, protection of publicly owned grazing lands, prevention of stream pollution, increased opportunities for outdoor recreation, and the protection of game and fish. The report indicates that the sale of forest products would repay the entire estimated cost in carrying charges of the activities recommended, thereby providing the other economic benefits enumerated as well as a substantial measure of flood control, as cost-free by-products.

FORESTS AND INDUSTRY

Railroads Spend Millions for Forest Products

The railroads of the country in 1926 spent a total of $1,559,032,331 for fuel and supplies, of which $186,291,234, or approximately 12 per cent, went for lumber and other forest products, according to information furnished to the Forest Service. In 1925 the railroads spent $170,305,031 for forest products out of their total purchases of $1,392,043,000. Crossties purchased in 1926 totaled 93,759,913 at a cost of $101,000,000—an increase of approximately 6,000,000 ties over the preceding year. Other purchases of forest products included switch and bridge ties, lumber and timber for car repairs and maintenance construction.

Average Haul of Lumber Doubled in 10 Years

The average rail haul of lumber from place of manufacture to place of use has practically doubled in the United States in 10 years, according to the Forest Service. Estimates for 1924 placed it at 725 miles, whereas a 1914 estimate put it at only 360 miles. Inbound lumber to the Northeastern States travels an average distance over the railroad of 840 miles; to the Lake States, 910 miles; to the Central States, 890 miles; and to the Prairie States, 1,515 miles. This does not take into account the large amounts of lumber that come by water through the Panama Canal from the Pacific Northwest to the Atlantic coast.

The Northeastern, Central, and Lake States were once great lumber-producing regions, but are now producing only a small fraction of their lumber needs, necessitating the bringing in of lumber from great distances. Better and more widespread practice of forestry on farm woodlands and the reforestation and protection of idle, cut-over, and burned-over lands in these States, says the Forest Service, will reduce this necessity in time, as they are still potentially large lumber producers.

Lumber Distribution and Consumption

Out of a total of 36,935,930,000 board feet of lumber cut in the United States during 1926, according to Bureau of the Census figures, the Forest Service estimates that 33,330,892,000 feet was for domestic consumption and 2,699,367,000 was exported. The remainder, less than one billion feet, was apparently added to mill stocks.

Over 44 per cent of the lumber used within the United States, or approximately 14,800,000,000 board feet, was shipped from the Pacific Coast States (Oregon, Washington, and California) and the southern pine region (Alabama, Arkansas, Florida, Georgia, Louisiana, Mississippi, Oklahoma, Texas)—the two greatest timber regions of the country. These same States also furnished practically all of the lumber that was shipped to foreign countries.

The source, destination, and quantities shipped in the domestic distribution of lumber are matters of direct concern to the lumber trade and its dependent industries. Considerable interest has, therefore, been evidenced toward studies of this subject lately begun by the Forest Service in cooperation with the Bureau of the Census, United States Department of Commerce. For 1926 the Forest Service has analyzed distribution figures based on returns from 1,754 of the largest lumber mills and groups of mills, which shipped approximately two-thirds of the national lumber cut. About 33 per cent of the total lumber distributed within the country does not go outside of the States in which it is cut. In 32 States and the District of Columbia the cut of softwood lum-

ber is less than the consumption. In a somewhat different list of States, 32 and the District of Columbia consume more hardwoods than they produce.

The consumption figures do not include imported sawed lumber, which in 1926 was estimated at 1,940,410,000 board feet. With this amount added in, the per capita consumption of the United States for 1926 is reckoned at 305 board feet, a decrease of 15 feet from the average for the three preceding years.

FOREST FIRES

Forest-Fire Record for United States

A total of 91,793 fires which burned over 24,300,000 acres of timber, brush, and grasslands, and caused direct damage amounting to $26,900,000, is the forest-fire record of the United States for 1926 according to figures compiled by the Forest Service.

The greatest area burned over and the greatest damage done, as well as the largest number of fires, were in the Southeastern States where 18,000,000 acres were affected and damage done totaling $11,000,000. In the Rocky Mountain States 735,000 acres were burned and damage done amounting to $5,000,000. In the Pacific States the figures were 1,746,000 acres and $3,300,000; in the Appalachian States, 503,000 acres and $2,400,000; in the West Mississippi group, 1,900,000 acres and $1,600,000; and in the Northeastern States, 211,000 acres and $1,900,000.

Mississippi, with 23,170 fires, had more than any other State. Alabama was next with 14,953, and Georgia was third with 6,446. At the other end of the scale, Delaware had but 37 fires, Nevada 21, South Dakota 66, Rhode Island 43, and Vermont 73.

The Southeastern States as a group—the Carolinas, Georgia, Florida, Alabama, and Mississippi—had the most fires, 54,200. The West Mississippi States, which include Missouri, Arkansas, Oklahoma, Louisiana, and Texas, came next with 10,657 fires. The Northeastern States had 6,251 fires, the Appalachian States 4,827, the East Mississippi States 1,747, the Lake States 3,326, the Rocky Mountain States 3,877, and the Pacific States 6,842.

Within the areas under protection, the 33,867 fires reported burned over 1,040,000 acres of merchantable timber, 1,682,000 acres of nonmerchantable or immature tree growth, and 1,394,000 acres with no tree growth at the time, the total area of forest land burned thus reaching 4,116,000 acres. Including the unprotected regions 24,300,000 acres of land were scourged by fire during the year.

More than 72 per cent of the fires are known to have been caused by man and 12 per cent by lightning. The causes of a little more than 15 per cent are unknown. Smokers lead all others as starters of forest fires with over 16 per cent of all, railroads come next with 14 per cent, and brush burning third with 12 per cent.

Federal Allotment to States for Forest-Fire Prevention

During the present fiscal year, 36 States cooperating in forest-fire prevention under the Clarke-McNary law will receive from the Federal Government a total of $876,911. State and private funds budgeted for forest protection during the year total $2,890,000 which, combined with the Federal appropriation amounts to less than 40 per cent of the $10,200,000 which it is estimated would be necessary to provide adequate fire protection to State and private forest lands in the United States. State allotments vary from $64,433 for Minnesota to $375 for South Dakota. The total allotment to the States, plus $73,089 for administration and inspection and $50,000 for studies in forest taxation make up the full $1,000,000 appropriated by Congress for work under sections 1, 2, and 3 of the Clarke-McNary law during the fiscal year 1928.

FORESTRY PRACTICE

Growing of Timber as Crop is New Business

Declaring that American business is about to take into its fold a new industry—the growing of crops of timber by private enterprise—the Chamber of Commerce of the United States of America is sponsoring a movement to arouse public interest in this important forestry problem of the Nation.

The national chamber takes the position that the major task of providing ample supplies of wood for the future needs of the Nation should rest upon private enterprise, and that all agencies—Federal, State, and private—should cooperate to this end.

The chamber advocates the following: (1) Adequate forest-fire protection, (2) taxation of growing timber upon the principle of the yield tax, (3) greater Federal research facilities, (4) national inventory of forest resources, (5) State forestry departments, (6) forest management, aimed to accomplish continuous forest pro-

duction, (7) reforestation of waste lands (lands not producing) at headwaters of navigable streams, by the Federal Government, and (8) reforestation of other waste lands by States and municipalities.

This position was determined by a referendum of the chamber's membership.

Forest Growth Can Be Increased Four Times

The net annual growth of the forests of the United States, estimated at 6,000,000,000 cubic feet, can be increased to 10,000,000,000 by 1950 and ultimately to 27,000,000,000 cubic feet, or over four times the present production, if adequate fire protection and businesslike forestry practices were put into effect on timbered and cut-over and waste lands, says the Forest Service.

The Forest Service estimates that nearly half of our forest area is at present producing no net growth, either because it is virgin forest where growth is offset by decay, or because it is so denuded by overcutting and fire as to be unproductive. The encouraging forecast is that with provision made for a succeeding forest growth upon the removal of the remaining virgin forest, and with effective fire control, care, and planting, our forest area will again come into production.

Sustained Yield Necessary to Profitable Forest Management

Sustained yield, under which only as much timber is cut yearly from a given unit of forest land as the land is replacing through growth, is a basic principle of profitable forest management which is rapidly gaining favor among timberland owners throughout the country, according to William B. Greeley, Chief of the Forest Service. He says:

"The principle of sustained yield is, of course, the underlying idea and essential aim of all forestry. We shall not have solved our national problem until the country as a whole is on a sustained-yield basis, with timber production balancing current use. To the individual lumber or paper or other forest industry the sustained-yield conception offers the most rational basis for stabilizing an enterprise throughout. If the forest industries of the West, where large quantities of virgin timber are still available, could forthwith be placed on a sustained-yield basis, the current output of forest products would not be materially curtailed but expansion would be held down, overproduction would be cured at its source, and a rational stability would be introduced into all phases of industrial planning."

For many of the larger forest industries in the Eastern States, a sustained yield can be attained only after a considerable period of reforestation, and would involve, for a time at least, a reduction from the present rate of cutting. "It is desirable, however," says the Forester, "to recognize that the general reorganization of our forest industries around the sustained-yield conception is necessary, that its accomplishment is the great goal to be sought."

To date, the net gains in private forestry practice still fall far short of providing for the future productivity of the 242,000,000 acres of forest land in industrial ownership. The area of cut-over land left in poor productive condition is still enlarging, though probably at a substantially lower rate than 10 years ago. The current growth of timber probably is increasing in response particularly to the expanding protection of cut-over lands from forest fires, but still is far short of replacing the current drain upon the forests.

Small Trees Unprofitable to Log

Two trees standing side by side may be cut by the same mill and one make a profit of $25 a thousand board feet and the other show a loss of $12, according to W. W. Ashe of the Forest Service, who has investigated logging and mill methods in the South. A like study in the Lake States has shown that hardwood logs below 13 or 14 inches in diameter are being produced and milled at a loss. In both cases the reason is that it costs more to produce lumber from the small logs and the product sells at a lower price.

The practice of cutting small trees, says Mr. Ashe, not only depletes the forest capital in growing trees but also causes the operator who cuts them to lose money. By leaving the small trees, present profits are increased and greater future profits assured, since the young trees when released from competition for light and soil moisture by the removal of the mature timber, increase in size and value at a rapid rate. Thus successive new crops of timber are provided and the sawmill owner is able to continue his operations on a permanent basis.

FARM WOODLANDS

Farmers Should Plant Trees

More than 44,000,000 young forest trees were planted in 34 States during 1926 by farmers, private landowners, and State forestry organizations, according to Alfred B. Hastings, forest inspector of the Forest Service.

Converting waste farm land into profitable wood lots is becoming a very popular movement through many of the agricultural regions of the country, says Mr. Hastings. Farmers last year put out more than 22,500,000 trees, which at the rate of 1,000 trees per acre means 22,500 acres of idle farm land put to work. Other private owners planted nearly 13,000 acres during the same period, and forest planting on State lands in 17 States totaled 9,000 acres.

Stock used for farm planting was distributed by State agencies in cooperation with the Forest Service under the terms of the Clarke-McNary Act. The cost per thousand for the various kinds of trees ranged from $1 to $10.

Every farmer, according to Mr. Hastings, should carefully consider the advantages to be gained by planting to trees land that is too rough or sterile for farming. Though trees take a number of years to reach maturity, a young plantation adds cash value to the farm, just as a young orchard does. In a few years it yields small material in the form of thinnings, such as poles and fence posts; later as fuel and pulp wood; and finally ties and saw timber. Thus the farm wood lot becomes a savings bank that pays compound interest.

Most of the States indicated in the table, "State forestry statistics," on page 16, maintain nurseries and can furnish young trees for planting. Inquirers should address the State forester or other official indicated.

Grazing and Fire Detrimental to Farm Woodlands

If the woodland owners of the central hardwood region wish to keep their lands growing timber they must discontinue pasturing the woods and must prevent forest fires. These are the conclusions reached by C. R. Tillotson, forest inspector of the Forest Service, after an exhaustive study of timber growing and logging practice on about 40,000,000 acres of woodland in Ohio, Indiana, Illinois, Iowa, Missouri, and portions of adjacent States.

To manage a farm woods for continuous production, the general principle is to cut not more than 50 or 60 per cent of the total amount of timber at one time, says Mr. Tillotson. The largest trees of the better species should be cut and the thrifty smaller trees left to grow in size and be cut later. The species of little commercial value and the poorer specimens in all sizes should be cut as far as possible.

The common practice of turning livestock into the woods interferes with timber production. About 75 per cent of the small woodlands on farms are heavily pastured, and the damage to large trees and young growth probably far outweighs the value of the forage. Fires also make heavy inroads on timber yield. In spite of this damage, many fires are deliberately set with the idea of improving the pasture.

The central hardwood region offers numerous advantages in the growing of timber crops on the farms, in the opinion of Mr. Tillotson. There is a great deal of rough land in farms that is well suited to growing trees, whereas it is of low value for anything else. Even some of the land which has been cleared for cultivation and found unprofitable can be put to better use growing trees.

One of the principal factors unfavorable to timber growing in the central hardwood region is the persistence of the idea that all woodland must ultimately be cleared for field crops. Much of the farm land in the region was developed through the laborious process of clearing it of timber, and, although the need for clearing has largely passed, the idea still persists that land should practically without exception be "improved" by cultivation. But there is a considerable area of poor land on farms in this region better suited to growing timber crops than anything else, and timber growing is being found profitable by those who go at it seriously.

The central hardwood forest region differs greatly from other forest regions in the United States, in that three-fourths of the timber-producing acreage is in the form of farm woodlands, generally 10 to 40 acres in extent. By reason of good soil and favorable climate the reason is highly productive of hardwood timber of fine quality, its oak, hickory, ash, and walnut having won almost world-wide renown by their excellence. A good market exists right at hand for all the timber that can be grown in the region. It contains the most impor-

tant centers of the furniture, veneer, automobile, and farm-machinery industries, has numerous other hardwood industries, such as the manufacture of wood handles and flooring, and the farms of the district require large quantities of posts, poles, and cordwood.

GRAZING

Conservative Grazing Pays

More than one-third of the area of the United States is used by the range livestock industry, which produces a large part of the Nation's beef and lamb and the major portion of its wool and corn belt feeders. A sustained, profitable, range livestock industry depends on the permanent maintenance of the range resources through conservative grazing.

Conservative grazing is simply utilizing the forage to no greater degree than will assure perpetuating the vigor and growth of the important palatable range plants. In average years at least 10 to 15 per cent of the palatable herbage of the valuable range plants should be left at the end of the grazing season. This insures reseeding.

Conservative grazing recognizes that spring is the critical period of the range year and requires that a portion of the range area be reserved for spring use. In an average year part or all of the feed on such reserved spring range may not be used, but, even so, it is better to have this margin available as an insurance during drought years and to avoid the risk of bringing about a gradual deterioration of the range.

On the Santa Rita Range Reserve in southern Arizona the practice of conservative grazing, in connection with the range experiments under way there, has maintained profitable cattle production over a period of 10 years with no necessity for forced sale of the improved breeding herd during drought. An average annual calf crop of 78 per cent was secured and an average loss of only 3 per cent was sustained, although 7 of the 10 years from 1916 to 1925 were drier than normal. On the basis of the average annual calf crop and loss for 10 years at 1925 cattle prices, a 7.4 per cent profit on an investment of approximately $85 per cow was obtained.

Representative southern Arizona outfits, grazing unregulated, overgrazed ranges potentially equal to those of the reserve, produced an average annual calf crop of 53 per cent, sustained an average annual loss of 10 per cent, and showed a net loss annually of 5.8 per cent on an investment of about $55 per cow.

An attempt to graze more livestock on the range than the available forage will support always results in a shortage of feed. Continued overgrazing, especially during dry years, is reflected in poorer condition of cattle, smaller calf crops, excessive losses in drought years, poor development of calves, sacrifice of good breeding stock, heavy cut-backs in animals for sale, even at low prices, and unprofitable production.

Historic Longhorns to Be Preserved

The long-horned or Spanish breed of cattle, once so numerous in the Southwest, will be preserved by the Forest Service from complete extinction through the establishment of a small herd on the Wichita National Forest in Oklahoma, for the benefit and education of future generations interested in pioneer history.

The Wichita National Forest lies in the heart of the range of the old southern herds and is part of the region known as "North of 36" over which wandered the plains buffalo and the Indian. Here also grazed some of the pioneer herds of long-horned cattle, when the livestock industry of the Southwest was in its infancy.

A herd of 20 cows and 3 bulls has been selected by expert cattlemen familiar with the characteristics of the longhorn and of the southwestern ranges, and are now grazing in a pasture adjoining the one occupied by the herd of buffalo on the Wichita Forest.

FISH AND GAME

Forest Fires Destroy Game and Fish

Groups of deer huddled together in a little opening in the forest—all burned to death, porcupine with quills ablaze, quail, and other game birds and their nests destroyed, and dead fish floating on the ashy waters of mountain streams—are all too familiar sights to the forest ranger, and mark the annual toll of wild life taken by the red enemy of the forest.

Few sportsmen realize how birds and animals are driven out by fire, how coverts and nests are destroyed, and how the food upon which wild life depends goes up in smoke when the forest burns. The Forest Service states that forest and game experts have estimated that the annual game

losses from fire equal the total "bag" of all the hunters.

Forest and brush fires not only destroy the forage upon which big game live, but so scorches and burns many of the animals that they die. A fire sweeping across the nesting grounds of grouse and other game birds destroys the eggs and young birds and drives the parent birds from their home. Fire also spoils the fishing, for good fishing depends on clear water, and when the forest is destroyed the resulting erosion fills the streams and lakes with ashes and mud and puts an end to good sport.

Many fires are annually started in the woods by careless hunters and fishermen. Realizing this fact, the leading sportsmen's associations and outdoor clubs of the country are joining with Federal and State forestry authorities in a widespread educational campaign looking to the preservation of wild life by the prevention of man-caused fires.

Game Animals in the National Forests

The national forests are rich in resources of very great value for other than purely commercial purposes. One of the most important of these is wild life, and it is estimated by forest officers that there are 968,000 big-game animals and beaver in the national forests of continental United States and Alaska.

Deer, with a total of 671,050 animals, of which over 236,000 are within the forests of California, is the leading game animal. Elk is second, with 82,478 head, over one-half of which are found in the forests of Wyoming and Montana. Mountain sheep and beaver are most plentiful in Colorado, black and brown bear in California, moose in Alaska and Wyoming, antelope in Idaho and Arizona, and grizzly bear and mountain goats in Alaska.

The estimated number of game animals and beaver in the national forests on December 31, 1926, was as follows: Dear, 671,050; elk, 82,478; black and brown bear, 47,865; mountain goats, 18,418; mountain sheep, 13,285; moose, 7,192; antelope, 6,942; grizzly bear, 5,814; caribou, 174, and beaver, 115,676.

NATIONAL FORESTS

Area of National Forests

The aggregate net area of the 159 national forests of the United States on June 30, 1927, was 158,800,424 acres, or nearly 7 per cent of the total land area of the country. National forests are now located in 33 States and in the Territories of Alaska and Porto Rico. The estimated value of the resources of these forests is $1,500,000,000, and the net revenue received from timber, grazing, and other resources during the fiscal year 1927 was $5,166,606.

Of the total area of national forests, more than 132,000,000 acres lie west of the Great Plains, 21,000,000 acres are in Alaska, and 4,000,000 along the Atlantic seaboard, of which some 2,500,000 acres is land in the Eastern and Southern States at the headwaters of navigable streams which has been purchased by the Government under the provisions of the Weeks law.

Within the national forests are 15 national monuments and 19 national game refuges.

The national forests are managed and protected by the Forest Service under the policy of "conservation through wise use." Such uses include the growing and cutting of timber on a perpetual-crop basis, use of range lands for livestock, recreation, and many other activities. The national monuments and game refuges in the national forest are also under the jurisdiction of the Forest Service.

Timber Cut of the National Forests

The cut of timber in the national forests under commercial and cost sales for the fiscal year ended June 30, 1927, totaled 1,170,000,000 board feet. In addition approximately 83,447,000 board feet was cut under land exchange agreements, making the total use of national-forest timber somewhat greater than in 1926.

Increases in timber cut, foresters say, are the result of a normal growth brought about largely by the development of private timber properties, which in turn has made the Government timber more accessible. It is not the policy of the Forest Service to force its timber on the market, and sales are made only after careful consideration of the necessary balance between milling capacity and the growth of the timber and the part the Government timber should play in local economic development.

That the Forest Service timber-sale policy has been one of conservative development rather than of forcing the exploitation of the national forests is indicated by the fact that the annual cut of timber has increased but 178,000 000 feet during the last five years,

that it is still one-sixth or less of the annual yield which the forests could maintain in perpetuity, and that, although the national forests contain one-fourth of the standing timber in the United States, they now furnish less than 2 per cent of the current production of lumber.

The most notable development in the timber-sale business of the year 1927 was the award of two large pulp-wood units in Alaska, aggregating 1,670,000,000 cubic feet. The great importance in these awards lies not in the sales themselves but in what they mean to the development of Alaska. These pulp-wood sales represent the culmination of 15 years of work by the Forest Service to get the newsprint industry extended to Alaska. Each project will require an investment of at least $8,000,000 or $10,000,000 in water-power development, manufacturing plant, and logging equipment. These two units are but a portion of the available power and timber resources of Alaska, where it is estimated that five or six large plants, producing an aggregate of 1,000,000 tons of paper annually, can be maintained in perpetuity.

45,000 Miles of Forest Roads and Trails Built

To the close of the fiscal year ended June 30, 1927, there has been constructed within and adjacent to the national forests a total of 13,219 miles of forest roads and 31,607 miles of trails, representing an aggregate expenditure of $63,989,507 of Federal funds and $15,611,956 of cooperative money.

The road system of the national forests now includes 39,448 miles, of which 15,994 miles are considered to meet satisfactory standard. The trail system totals 85,892 miles, of which 73,431 miles is considered satisfactory.

The desired transportation system for the national forests, as planned for the next 10 years, includes a total of 51,268 miles of roads and 110,385 miles of trails. To reconstruct and complete the present unsatisfactory roads and trails in the system and build the proposed new ones will require a total of $177,124,616, exclusive of maintenance.

To the close of the last fiscal year, the financial cooperation in forest road and trail construction furnished by interested States and counties containing national forests has amounted to approximately one-fourth of the amount appropriated from Federal funds. Oregon has contributed the largest amount with $5,059,540, while California is second with $3,075,678. The three States which show the largest mileage of forest roads completed by July 1, 1927, are Oregon, with 2,098.8 miles; Idaho, with 1,672.8 miles; and California, with 1,285.9 miles.

FOREST RESEARCH

Why Forest Research?

Why forest research? And why as a national undertaking? The answers may be inferred in part from what American industry in general is doing in research.

Corporate groups, such as the American Telephone & Telegraph Co., General Electric Co., DuPont Co., General Motors Research Corporation, and the Eastman Kodak Co., spend millions of dollars yearly in research. In 1926, the National Bank of Commerce of New York estimated these expenditures as $100,000,000 to $200,000,000. Fundamentally, business corporations are doing research to increase service to society, which may be either in the discovery of new or improved materials and uses or in better methods of distribution.

Three important questions are involved in the solution of the forest problem: (1) The proper use of one-fourth of the land area of the United States, (2) adequate supplies of forest products in perpetuity to meet North American requirements, and (3) the maintenance and stabilization of a very large group of forest industries.

Essentials in the solution of the forest problem, which can be obtained only through research, fall in four main categories: (1) A complete and practical science of tree growing and protection for our forests—the most complex Temperate-Zone forest in the world; (2) waste reduction in the manufacture and utilization of wood, which is now responsible for about two-thirds of the annual drain on our forests; (3) economic information concerning the growing, manufacture, and distribution of wood, especially in such matters as timber supplies and requirements, the distribution of forest products, forest taxation, etc., and (4) full use of the forest, not only for timber, forage, wild life, and other products, but also for its influence on water supply, erosion, recreation, and general public health.

Forest research has already made enough progress in furnishing information to justify going ahead in practical forestry operations in many

regions. We know how to cut timber with reasonable assurance of natural renewal. We know reasonably well how to grow nursery stock and to plant the few species now commonly used in artificial reforestation. We have in part the foundation of a new science for the utilization of wood. We have exhaustive data on the strength of North American wood species. We have made an advance toward a scientific foundation of livestock grazing on our forest lands. Enough has been done on the more important phases of forest research to demonstrate its possibilities and its value and to show the need for research on a greatly increased scale.

A special committee appointed to study this problem estimates that the current annual expenditures for forest research in the United States by all agencies probably does not exceed $2,600,000, divided as follows: Federal Government, $1,400,000; States, $200,000; endowed institutions and universities, $100,000; industrial corporations, associations, and private owners, $900,000.

In the light of these figures, as well as from the consideration of the existing situation in forestry in the United States, the committee believes that an annual expenditure by all agencies of nine to twelve million dollars annually by the end of the next decade would not be excessive. When a single industrial group like the Bell telephone system already expends $10,000,000 annually for research it is not unreasonable to look forward to regularly increasing expenditures for forest research. Nor is this sum unreasonable when it is considered that it will be expended for work on problems involving one-fourth of our total land area, the permanence of our fourth largest group of industries, and the supply and effective utilization of one of our most important commodities.

The necessity for fundamental research in the various natural sciences which relate to soils, plant life, and the organic substances which forests supply; industrial research that will make possible better adjustment between forest resources and our manifold requirements; and economic research aimed at the whole great problem of land use, has already been recognized by the Federal Government. A series of forest experiment stations have been established in the major forest regions of the country, namely, the Northeastern, Appalachian, Allegheny, Southern, Central States, Lake States, Northern Rocky Mountain, Pacific Northwest, and California. The central Rocky Mountain region and the Southwest still remain to be equipped for forest research.

FORESTRY LEGISLATION

The McNary-Woodruff Bill

A measure popularly known as the McNary-Woodruff bill, and providing for a 10-year program of forest acquisition in the East, was passed with amendments by both Houses of the 69th Congress. Action by the Senate was late in the session, and final approval of amendments by both Houses in the closing days of Congress proved impracticable. The bill was again introduced in the Seventieth Congress, where favorable action is expected. Briefly, the specific objectives of the program are:

1. The continuation of the original program of forest-land acquisition in the White and Appalachian Mountains on an enlarged scale, which will add 3,000,000 acres during the next 10-year period.

2. Two and one-half million acres, in properly distributed forest units, in the Lake States of Minnesota, Wisconsin, and Michigan.

3. A system of southern forests, aggregating approximately 2,500,000 acres, in the pine-producing regions of the South.

Expenditures would aggregate $40,000,000 which would be available at the rate of $3,000,000 a year for the first five years and $5,000,000 a year for the second five years.

Passage of the measure will mark definite and substantial progress in meeting a most important phase of the forest problem in the eastern half of the United States.

McSweeney-McNary Bill

The most comprehensive bill dealing with forest research that has ever been presented in the United States was introduced in the last Congress by Representative John McSweeney of Ohio and Senator Charles L. McNary of Oregon. This bill is based upon the recommendations for organic forest-research legislation made by a special committee of the Society of American Foresters in a report entitled "A National Program of Forest Research." It is intended to codify and round out existing legislation for forest research in the United States

Department of Agriculture, and to authorize appropriations large enough to permit satisfactory development in this field during the next decade.

The McSweeney-McNary bill provides for an enlarged scale of forest research that should be undertaken by all agencies, including the Forest Service, the Bureaus of Plant Industry, Entomolog and Biological Survey, the Weather Bureau, and others. Provision is made for investigation and study of such problems as silviculture and forest management, or the renewal and growing of forest crops; the protection of forests against insect and fungous diseases; the influences of the forest upon stream flow, erosion, etc.; forest ranges and their utilization by livestock and game; wild life as a product and in its relation to forest production; the utilization of wood and other forest products; and, finally, the economic aspects of all these questions.

An important specific provision of the bill would direct the maintenance of the 9 regional forest experiment stations already established in the most important forest regions of the country and the establishment of three additional stations in the continental United States, and one each in Alaska and the West Indies.

The growing of timber in the United States is in its infancy, according to forestry experts. We have, they say, no traditional methods of timber culture, as in agriculture. European methods apply to our different forest species and conditions only in a rough way. The cheapest, most effective, and most practical means of acquiring the needed scientific information is through research.

Progress in State Forestry Legislation

That the past year has shown an increasing interest in forestry throughout the country is evidenced by the legislation enacted in a number of States, according to William B. Greeley, Forester of the United States Department of Agriculture.

"It is evident," says the Forester, in reviewing the progress in State forestry legislation, "that the States are becoming more and more alive to the importance of forestry and the necessity of progressively developing their forestry policies."

During the year, three States—Florida, South Carolina, and Delaware—passed laws for the establishment of State forestry departments and the appointment of State foresters. Similar legislation was again proposed in Arkansas, but failed. California created a department of natural resources, under the general supervision of a director, with a division of forestry administered by the State forester and guided as to policies by a State board of forestry.

Rhode Island made an important change in its forestry organization by putting it under the department of agriculture, North Carolina revised the board of conservation and development by increasing its membership, and Louisiana provided for an additional member on its forestry board.

In Ohio, legislation was enacted authorizing the board of control of the Ohio Agricultural Experiment Station to acquire representative tracts suited for research and demonstration in practical forestry. Maine provided for the establishment and management of town forests, and Wisconsin made similar provision for county forests. Washington authorized the State to accept from counties tax lands suitable for State forests, Michigan provided for the retention of such lands by the State, and Minnesota set aside all State lands within the boundaries of the Minnesota National Forest as State forests. Pennsylvania made an appropriation of $450,000 toward the acquisition of about 7,200 acres of private land in order to preserve a portion of the original forests of the State and for other forests and parks, subject to the contribution of not less than $200,000 of private funds for the same purpose. Maryland authorized the formation of auxiliary State forests through agreement with private landowners.

In many of the States, the forest-fire legislation was revised. For example, in Montana the State board of land commissioners may now contract with organized protection agencies for the protection of State lands, and uncontrolled or spreading fires between May 1 and September 30 are declared a public nuisance which the landowner must make reasonable efforts to abate. Other States which enlarged their forest-fire legislation were Oregon, California, Washington, New York, Nevada, Utah, and Wisconsin.

Some of the most outstanding legislative measures adopted during the year were aimed at encouraging the growing of timber. California, Louisiana, Minnesota, and Wisconsin amended their constitutions to permit changes in the taxation of forest lands, and Louisiana and Minnesota passed laws putting such amendments into operation. In addition, Minnesota cre-

ated a commission of inquiry looking to a further development of the State's forest policy for the promotion of private timber growing, and directed the commission of conservation to make recommendations regarding all State-owned lands that are suitable for reforestation purposes.

MISCELLANEOUS FACTS

The great American game of baseball uses its share of timber. White ash is now the sole possessor of the bat market. One well known bat company has an immense factory in Chicago with a capacity of 3,000 bats a day. They maintain a lumber stock sufficient to make 900,000 bats. The wood used for bats must be air-dried for two years before being turned.

Wood pulp is invading the field until recently held by the cotton linters for making the little cylindrical rolls or "dams" which dentists place in the mouths of patients. The new dams are made of very soft paper rolled to the desired form and show varying degrees of absorptive power. Dentists state that they are preferable to cotton dams because they may be broken to desired lengths, give a smoother surface, and are free from the fuzz of the old-style dams which frequently became entangled in the revolving drills.

A double-action back-pack water pump with 5 gallons capacity is the best equipment for putting out spot fires in slash. This conclusion is the result of tests with six kinds of fire extinguishers, all chemical except the back-pack pump, conducted by E. I. Kotok, director of the California Forest Experiment Station, on the Stanislaus National Forest. None of the chemical extinguishers tried had more than a one-minute run of material, while it was found that the water pump could be used 20 minutes without refilling.

More than 1,000,000 linear feet of pine piling was used in closing the Caernarvon gap in the levee below New Orleans.

Germany has 160 commercial forest nurseries with a total area of 3,500 acres and an annual production of more than 1,000,000,000 conifers and 180,000,000 hardwoods. The annual demand for planting stock is approximately 1,500,000,000 conifers and 190,000,000 hardwoods—enough to plant about 500,000 acres.

Railroad fusees, which burn from 5 to 10 minutes, are extensively used by forest rangers in the national forests of the West for back-firing on large going fires and for winter brush burning on Government timber-sale areas.

Erosion, due to rushing rain water sweeping over the fields of the United States, takes $200,000,000 out of the pockets of farmers every year, according to the United States Bureau of Soils.

During the dangerous fire season, camping parties entering the national forests of California are required to carry a shovel and ax for each automobile or pack outfit. Smoking in the national forests is also prohibited, except in camps or at places of habitation.

"To control the river is to control the mountain." This ancient proverb was a guiding principle in the Japanese policy of erosion control and torrent regulation as long ago as 1683. Since that time reforestation has been applied extensively throughout Japan as a factor of prime importance in the protection of the tremendously valuable rice fields of the empire, and in insuring the permanency and full utility of the watershed resource. The United States can no longer fail to heed the conservation principle advanced in this old proverb.

About $666,000,000 is invested in forestry industry of Canada, according to an estimate of the Canadian Department of the Interior. Nearly one-third of this is in lumbering plants and sawmills, the remainder in pulp and paper operations. The annual production from the forests, including finished products, is worth about $440,000,000. Sawmills operating in the Dominion number more than 2,500. The annual cut of lumber approximates 4,000 million board feet. Spruce leads in the volume of cut and is followed by Douglas fir and white pine.

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STATE FORESTRY STATISTICS

State	State forestry appropriation, annual, 1927	State forest tree distribution, 1926	State forests, 1926	State parks, 1926	Other State forest land, 1926	State forester or similar officer, 1927
	Dollars	*Number*	*Acres*	*Acres*	*Acres*	
Alabama	50,000	27,000			175,000	Page S. Bunker, Montgomery.
California	188,165	2,850		12,845	50,000	M. B. Pratt, Sacramento.
Colorado		70,750			126,600	W. J. Morrill, Fort Collins.
Connecticut	137,500	1,531,000	20,000	7,000	2,000	A. F. Hawes, Hartford.
Delaware	5,000	10,000				William S. Taber, Dover.
Georgia	13,500					B. M. Lufburrow, Atlanta.
Idaho	121,000	82,500	700,000	7,200	200,000	Ben E. Bush, Moscow.
Illinois	67,200			1,220		R. B. Miller, Springfield.
Indiana	80,000	200,500	3,547	4,430	10,500	Ralph F. Wilcox, Indianapolis.
Iowa	21,000	49,950		7,000	5,000	Mark G. Thornburg, Des Moines.
Kansas		33,750		245		Albert Dickens, Manhattan.
Kentucky	15,000	4,000	3,624		15,000	W. E. Jackson, jr., Frankfort.
Louisiana	80,000	570,600	2,200		202,000	W. R. B. Hine, New Orleans.
Maine	201,000	147,750	100	25	330,000	Neil L. Violette, Augusta.
Maryland	50,000	179,700	3,835		2,000	F. W. Besley, Baltimore.
Massachusetts	443,730	2,938,950	97,000	12,000	48,000	W. A. L. Bazeley, Boston.
Michigan		385,550	333,000	7,745	739,000	Marcus Schaaf, Lansing.
Minnesota[1]		220,000	350,000	38,279	650,000	G. M. Conzet, St. Paul.
Mississippi	10,000					Roy L. Hogue, Jackson.
Missouri	12,000			25,500	46,000	Frederick W. Dunlap, Columbia.
Montana	39,400		566,000			Rutledge Parker, Missoula.
Nebraska		227,800		747	500	E. A. Nieschmidt, Lincoln.
New Hampshire	76,406	770,300	20,538		575	J. H. Foster, Concord.
New Jersey	313,775	1,093,150	18,954	16,000	4,000	C. P. Wilber, Trenton.
New York	748,870	20,481,100	2,026,741	83,212	15,500	W. G. Howard, Albany.
North Carolina	47,308	4,300		1,724	85,600	J. S. Holmes, Raleigh.
North Dakota	5,300			250	17,300	F. E. Cobb, Bottineau.
Ohio	225,000	1,545,900	33,773	32,510	22,900	Edmund Secrest, Wooster.
Oklahoma	15,000				27,300	George R. Phillips, Oklahoma City.
Oregon	50,000			640	77,868	F. A. Elliott, Salem.
Pennsylvania	1,155,000	10,567,200	1,131,885	9,541	2,624	J. S. Illick, Harrisburg.
Rhode Island	6,500					Leon D. Andrews, Providence.
South Dakota					80,000	Theodore Shoemaker, Custer.
Tennessee	42,300				22,110	R. S. Maddox, Nashville.
Texas	51,700		5,632	550	50,000	E. O. Siecke, College Station.
Vermont	41,000	1,778,800	30,504	160	713	R. M. Ross, Montpelier.
Virginia	30,000	27,800	588		1,500	Chapin Jones, University.
Washington	42,000	2,800	40,763	6,500	1,200,000	George C. Joy, Olympia.
West Virginia	34,000		15,393			A. B. Brooks, Buckhannon.
Wisconsin		1,188,050	97,000	91,000	150,000	C. L. Harrington, Madison.
Porto Rico	34,000	500,000	40,000		30,000	William P. Kramer, Rio Piedras.
Hawaii			587,228			C. S. Judd, Honolulu.

[1] $50.000 additional is available for fire suppression.

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